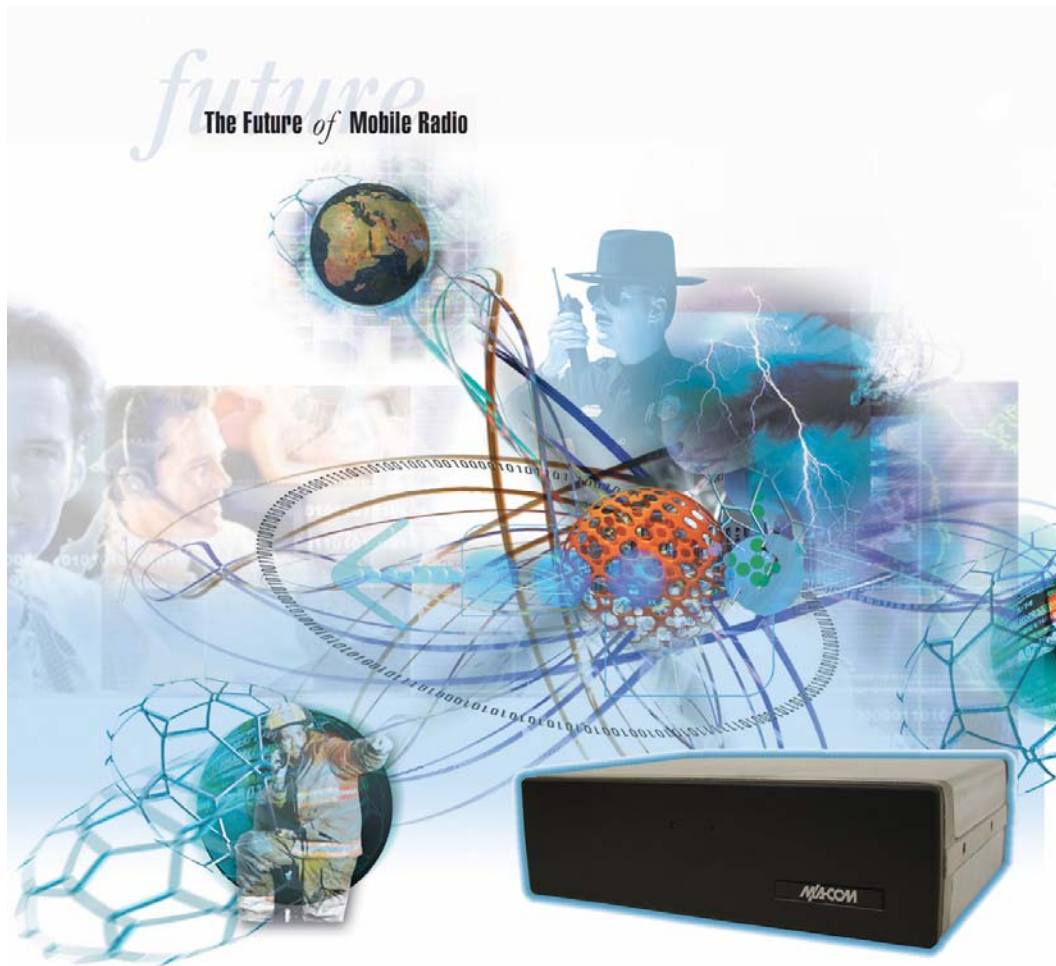


APPENDIX K: MANUAL

Please refer to the following pages.

Installation and Operator's Manual

MM21134
December-04



EDACS® D3100 RF Modem

tyco
Electronics

MACOM

REVISION	DATE	REASON FOR CHANGE
-	December 2004	Initial Release.

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Repairs to this equipment should be made only by an authorized service technician or facility designated by the supplier. Any repairs, alterations, or substitution of recommended parts made by the user to this equipment not approved by the manufacturer could void the user's authority to operate the equipment in addition to the manufacturer's warranty.

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1. RF ENERGY EXPOSURE INFORMATION

1.1 RF ENERGY EXPOSURE AWARENESS, CONTROL INFORMATION, AND OPERATION INSTRUCTIONS FOR FCC OCCUPATIONAL USE REQUIREMENTS

Before using your mobile two-way radio, read this important RF energy awareness and control information and operational instructions to ensure compliance with the FCC's RF exposure guidelines.



NOTE

This radio is intended for use in occupational/controlled conditions, where users have full knowledge of their exposure and can exercise control over their exposure to meet FCC limits. This radio device is NOT authorized for general population, consumer, or any other use.



CAUTION

Changes or modifications not expressly approved by M/A-COM, Inc. could void the user's authority to operate the equipment.

This two-way radio uses electromagnetic energy in the radio frequency (RF) spectrum to provide communications between two or more users over a distance. It uses RF energy or radio waves to send and receive calls. RF energy is one form of electromagnetic energy. Other forms include, but are not limited to, electric power, sunlight, and x-rays. RF energy, however, should not be confused with these other forms of electromagnetic energy, which, when used improperly, can cause biological damage. Very high levels of x-rays, for example, can damage tissues and genetic material.

Experts in science, engineering, medicine, health, and industry work with organizations to develop standards for exposure to RF energy. These standards provide recommended levels of RF exposure for both workers and the general public. These recommended RF exposure levels include substantial margins of protection. All two-way radios marketed in North America are designed, manufactured, and tested to ensure they meet government established RF exposure levels. In addition, manufacturers also recommend specific operating instructions to users of two-way radios. These instructions are important because they inform users about RF energy

exposure and provide simple procedures on how to control it. Please refer to the following websites for more information on what RF energy exposure is and how to control your exposure to assure compliance with established RF exposure limits.

<http://www.fcc.gov/oet/rfsafety/rf-faqs.html>

<http://www.osha.gov/SLTC/radiofrequencyradiation/index.html>

1.1.1 Federal Communications Commission Regulations

Your M/A-COM, Inc. EDACS D3100 RF Modem is designed and tested to comply with the FCC RF energy exposure limits for mobile two-way radios before it can be marketed in the United States. When two-way radios are used as a consequence of employment, the FCC requires users to be fully aware of and able to control their exposure to meet occupational requirements. Exposure awareness can be facilitated by the use of a label directing users to specific user awareness information. Your M/A-COM, Inc. EDACS D3100 RF Modem has an RF exposure product label. Also, your D3100 Installation and Operator's Manual includes information and operating instructions required to control your RF exposure and to satisfy compliance requirements.

1.2 COMPLIANCE WITH RF EXPOSURE STANDARDS

Your M/A-COM, Inc. EDACS D3100 RF Modem is designed and tested to comply with a number of national and international standards and guidelines (listed below) regarding human exposure to RF electromagnetic energy. This radio complies with the IEEE and ICNIRP exposure limits for occupational/controlled RF exposure environment at duty factors of up to 60% talk-40% listen and is authorized by the FCC for occupational use. In terms of measuring RF energy for compliance with the FCC exposure guidelines, your radio antenna radiates measurable RF energy only while it is transmitting (talking), not when it is receiving (listening) or in standby mode.

Your M/A-COM, Inc. EDACS D3100 RF Modem complies with the following RF energy exposure standards and guidelines:

- United States Federal Communications Commission (FCC), Code of Federal Regulations; 47 CFR §§ 2 sub-part J.
- American National Standards Institute (ANSI)/Institute of Electrical and Electronic Engineers (IEEE) C95.1-1992.
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999.



Table 1-1 lists the recommended minimum lateral distance from the AV102800V1 mobile antenna that must be provided for unaware bystanders in an uncontrolled environment, when the D3100 is transmitting at three watts. Transmit only when unaware bystanders are at least the uncontrolled recommended minimum lateral distance away from the transmitting antenna.

Table 1-1: Rated Power and Recommended Minimum Lateral Distance

MOBILE RADIO TX FREQUENCY RANGE	RATED POWER OF VEHICLE-INSTALLED D3100 RF MODEM	RECOMMENDED MINIMUM LATERAL DISTANCE FROM TRANSMITTING ANTENNA
		UNCONTROLLED
806-825 MHz	3.0 Watts	21 cm

1.2.1 Mobile Antennas

Install the radio's antenna (refer to Table 5-1 for applicable antenna part numbers) in the center of the vehicle's roof. These mobile antenna installation guidelines are limited to metal body motor vehicles or vehicles with appropriate ground planes. The antenna installation should additionally be in accordance with the following.

1. The requirements of the antenna manufacturer/supplier included with the antenna.
2. The installation manual providing specific information of how to install the antennas to facilitate recommended operating distances to all potentially exposed persons.

Use only the M/A-COM approved/supplied antenna(s) or approved replacement antenna. Unauthorized antennas, modifications, or attachments could damage the radio and may violate FCC regulations.

1.2.2 Approved Accessories

This radio has been tested and meets the FCC RF guidelines when used with the M/A-COM accessories supplied or designated for use with this product. Use of other accessories may not ensure compliance with the FCC's RF exposure guidelines, and may violate FCC regulations.

For a list of M/A-COM approved accessories refer to the product manuals, M/A-COM's Products and Services Catalog, or contact M/A-COM at 1-800-368-3277.

1.2.3 Contact Information

For additional information on exposure requirements or other information, contact M/A-COM, Inc. at 1-800-528-7711 or at <http://www.macom-wireless.com>.

2. SAFETY INFORMATION

2.1 COMMON HAZARDS

The operator of any mobile radio should be aware of certain hazards common to the operation of vehicular radio transmissions. Possible hazards include:

- **Explosive Atmospheres**

Just as it is dangerous to fuel a vehicle with the motor running, be sure to turn the radio OFF while fueling the vehicle. Do not carry containers of fuel in the trunk of the vehicle when the radio is mounted in the trunk.

- **Interference To Vehicular Electronic Systems**

Electronic fuel injection systems, electronic anti-skid braking systems, electronic cruise control systems, etc., are typical of the types of electronic devices that may malfunction due to the lack of protection from radio frequency energy present when transmitting. If the vehicle contains such equipment, consult the dealer for the make of the vehicle and enlist his aid in determining if such electronic circuits perform normally when the radio is transmitting.

- **Blasting Caps**



To prevent accidental detonation of electric blasting caps, **DO NOT** use two-way radios within 1000 feet of blasting operations. Always obey the “Turn Off Two-Way Radios” signs posted where electric blasting caps are being used. (OSHA Standard: 1926.900)

- **Radio Frequency Energy**

To prevent burns or related physical injury from radio frequency energy, do not operate the transmitter when anyone is within two feet of the antenna.



Before jump starting or changing the vehicle battery, it is strongly suggested that the 3A fuse located in the Red lead (IGN A+) be removed. This will insure that the radio is protected from damage during the battery charging process. Replace fuse when charging is completed.

3. INTRODUCTION

This manual describes how to program, install, and use the M/A-COM EDACS® D3100 Data RF Modem. The EDACS D3100 Data Modem is a data-only mobile or fixed-station radio used in the Enhanced Digital Access Communications System (EDACS) trunking environment systems.

Table 2.1: EDACS D3100 RF Modem

EDACS D3100 MODEL	FREQUENCY	POWER LEVEL
TX	806-825 MHz	3 W
RX	851-870 MHz	3 W

4. DESCRIPTION

D3100 comes ready to connect into a system with a personality containing two systems. The power-on default system is an EDACS Data System named “Site” containing an EDACS Control Channel (806.075 TX/851.075 RX) and an EDACS Working Channel (820.975 TX/865.975 RX). The second system is named “851” and is a conventional system for use in parametric testing and calibration, should it be required.

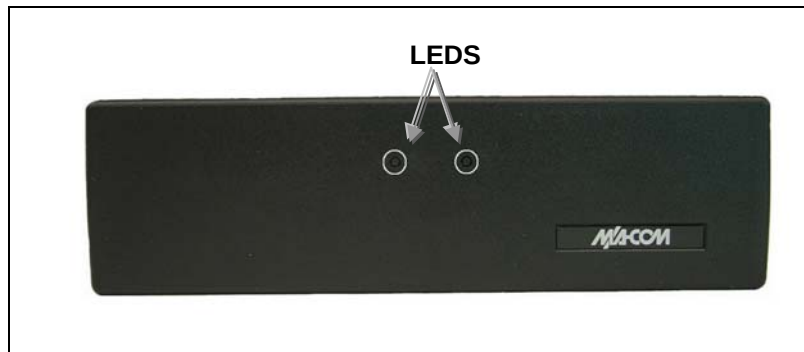


Figure 4-1: D3100 Front View

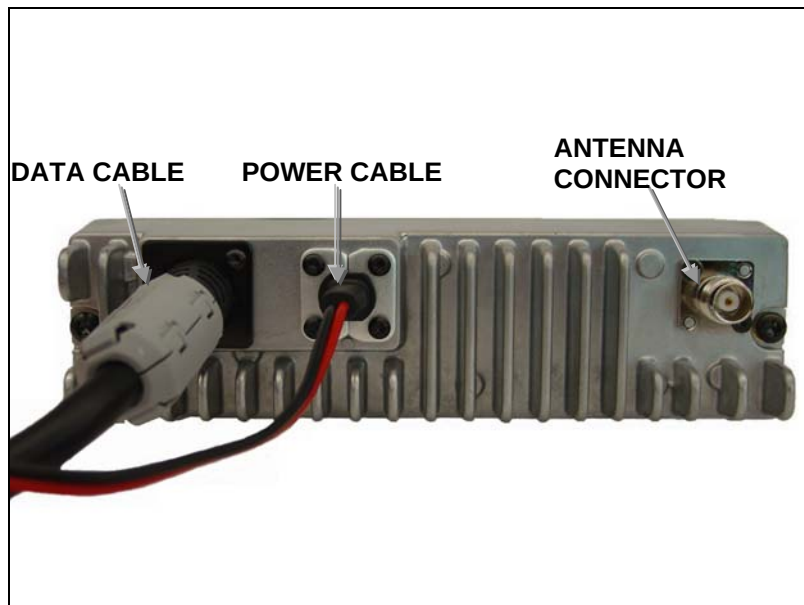


Figure 4-2: D3100 Rear View

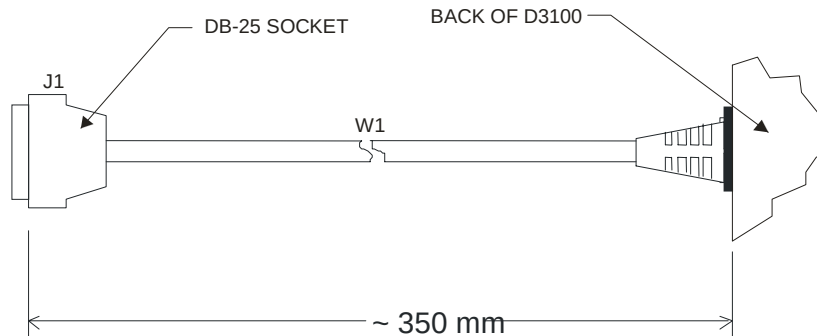
4.1 DATA CONNECTOR FUNCTIONS

The data connector on the D3100, in shape and form, is similar to the “option connector” of the E500M Mobile Radio made by M/A-COM. The following pinouts and drawing define the cable and connections.

DATA CONNECTOR (J1) PIN ASSIGNMENTS (DB-25-Socket)

(Pin # - Pin Function)	
1. <i>NC</i>	15. <i>NC</i>
2. <i>GND</i>	16. <i>NC</i>
3. <i>IGN A+ (Not Used)</i>	17. <i>NC</i>
4. <i>NC</i>	18. <i>FPROG (Connect to A+ for Programming Mode)</i>
5. <i>RQST</i>	19. <i>EXT_MIC_H</i>
6. <i>Audio OUT</i>	20. <i>A+ (Connect to FPROG for Programming MPode)</i>
7. <i>NC</i>	21. <i>RS485-</i>
8. <i>RS485+</i>	22. <i>GND</i>
9. <i>NC</i>	23. <i>NC</i>
10. <i>NC</i>	24. <i>RTS</i>
11. <i>CTS</i>	25. <i>XDATAOUT</i>
12. <i>XDATAIN</i>	
13. <i>EXT_MIC_L = GND</i>	
14. <i>NC</i>	

NC = No Connection to functional circuits in Modem



D3100 DATA CABLE
Figure 4-3: D3100 Data Cable

5. OPTIONS AND ACCESSORIES

Table 5-1: EDACS D3100 RF Modem Options and Accessories

DESCRIPTION	PART NUMBER
D3100 Test Box	TS103114V1
Roof Top Antenna	AV102800V1
Yagi, 8dBd, Fixed-station Antenna	AN103358V1
Control Unit, Orion, Scan, D2CP5L	KRY 1011632/12
Data/Programming C-U Adapter Cable	CA103067V1
Mounting Bracket Kit	19B802672P1

5.1 ADAPTER CABLE, CA103067V1

This accessory, part of the D3100 package, provides connection from the D3100 Data Connector to a data connection, DB9-RS232 format, and to an optional Orion Control Unit, should this be required. It also provides the means of initiating “programming mode” and programming the D3100 from a PC from its “**COM**” (serial) port. A drawing and wiring schematic of this cable is shown in Figure 5-1.

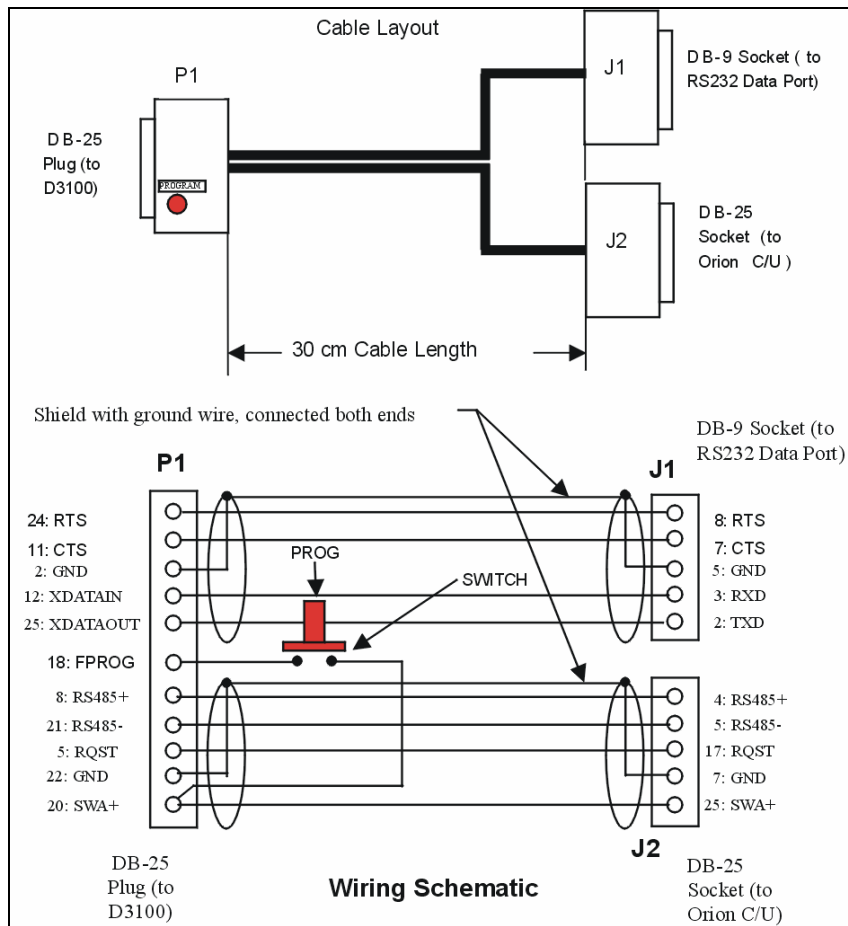


Figure 5-1: Adapter Cable CA103067V1

6. INSTALLATION

6.1 UNPACK AND CHECK THE EQUIPMENT

Before starting the installation, carefully unpack the equipment and inspect the equipment for damage. If there is any damage, file a claim with the carrier immediately.

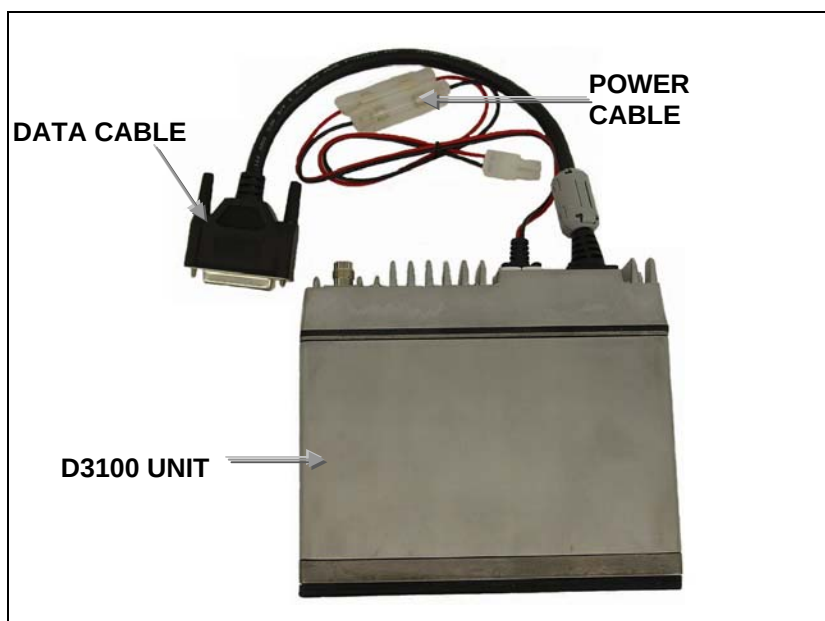


Figure 6-1: D3100 Unit

6.2 PLAN THE INSTALLATION

Before starting, plan the modem's installation carefully so that it will be:

- Functional
- Neat
- Protected from water damage
- Easy to service

The procedures in this section provide a guideline for installing the data modem. In some applications it may be necessary to deviate slightly from the recommended procedure and the order in which the equipment is installed.

To ensure the feasibility of the cable routes, it is suggested that the cables be run prior to installation of the radio. Ensure slack is left in each cable so the radio may be removed for servicing with all connections remaining intact.

D3100 is intended for installation within a weatherproof building, enclosure, or vehicle. Typical installations are:

1. Elevated (usually beyond unassisted reach) in an outside enclosure with co-located antenna,
2. Mounted inside a building and connected by RF cable to outside antenna (usually above unassisted reach), or
3. Vehicle installation with vehicle rooftop antenna.

Install the D3100 so that the LED indicators on the front panel are visible during operation.

If installation is within the United States, it is recommended the unit be installed by one of the many M/A-COM Authorized Service Centers located throughout the U.S. Personnel at these centers are experienced in installations of this type and can provide a safe, neat, and functional installation.

6.3 INSTALL D3100 RF MODEM

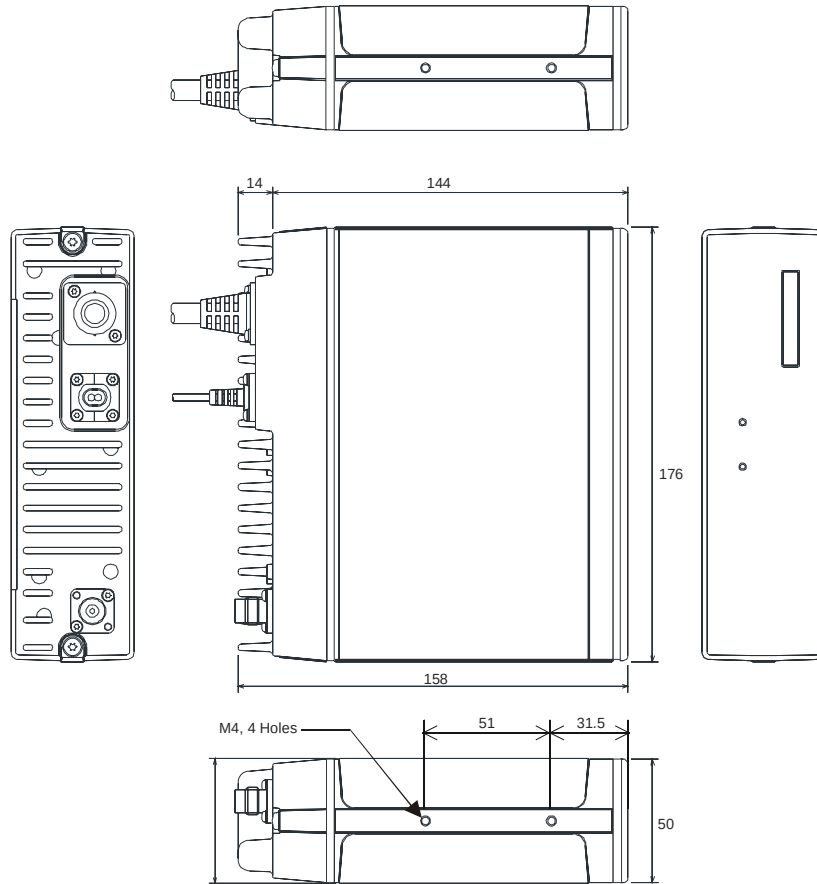
Mount the antenna, following the included instructions, in a manner that prohibits or precludes the presence of anyone within the prescribed MPE Radius when the transmitter is on (see Table 1-1). Connect the antenna to the D3100 antenna connector.

In order for the D3100 to communicate with the RS-232 device, the D3100 data cable must be connected to the RS-232 device using an appropriate data cable or cable adapter. The accessory Data/Programming/C-U Adapter Cable (CA103067V1) that comes with the D3100 provides this interconnect function. When assembling hand-made adapters, make sure the corresponding function is connected between the D3100 Data Cable and other devices. Connection of non-corresponding (dissimilar) functions may cause damage to the D3100 or connected equipment and/or failure of proper performance. (See Section 4.1 for the data connector functions.)

Connect the polarized power plug of the D3100 power cable to a corresponding polarized socket on a 13.6 +/-15% DC, regulated power supply, the Red lead to positive (+) and Black lead to negative or ground (-). When power is on, the Yellow LED is on.

If the correct personality has been entered, correct data connection, antenna connection, and power connection are made, and power is on, then D3100 is ready for data calls.

6.4 D3100 DIMENSIONS



D3100 MECHANICAL VIEWS

DIMENSIONS IN MILLIMETERS

7. WARRANTY

- A. M/A-COM, Inc. (hereinafter "Seller") warrants to the original purchaser for use (hereinafter "Buyer") that Equipment manufactured by or for the Seller shall be free from defects in material and workmanship, and shall conform to its published specifications. With respect to all non-M/A-COM Equipment, Seller gives no warranty, and only the warranty, if any, given by the manufacturer shall apply. Rechargeable batteries are excluded from this warranty but are warranted under a separate Rechargeable Battery Warranty (ECR-7048).
- B. Seller's obligations set forth in Paragraph C below shall apply only to failures to meet the above warranties occurring within the following periods of time from date of sale to the Buyer and are conditioned on Buyer's giving written notice to Seller within thirty (30) days of such occurrence:
1. for fuses and non-rechargeable batteries, operable on arrival only.
 2. for parts and accessories (except as noted in B.1) sold by Seller's Service Parts Operation, ninety (90) days.
 3. for for all other equipment of Seller's manufacture, one (1) year.
- C. If any Equipment fails to meet the foregoing warranties, Seller shall correct the failure at its option (i) by repairing any defective or damaged part or parts thereof, (ii) by making available at Seller's factory any necessary repaired or replacement parts, or (iii) by replacing the failed Equipment with equivalent new or refurbished Equipment. Any repaired or replacement part furnished hereunder shall be warranted for the remainder of the warranty period of the Equipment in which it is installed. Where such failure cannot be corrected by Seller's reasonable efforts, the parties will negotiate an equitable adjustment in price. Labor to perform warranty service will be provided at no charge during the warranty period only for the Equipment covered under Paragraph B.3 and B.4. To be eligible for no-charge labor, service must be performed at a M/A-COM factory, by an Authorized Service Center (ASC) or other Servicer approved for these purposes either at its place of business during normal business hours, for mobile or personal equipment, or at the Buyer's location, for fixed location equipment. Service on fixed location equipment more than thirty (30) miles from the Service Center or other approved Servicer's place of business will include a charge for transportation.
- D. Seller's obligations under Paragraph C shall not apply to any Equipment, or part thereof, which (i) has been modified or otherwise altered other than pursuant to Seller's written instructions or written approval or, (ii) is normally consumed in operation or, (iii) has a normal life inherently shorter than the warranty periods specified in Paragraph B, or (iv) is not properly stored, installed, used, maintained or repaired, or, (v) has been subjected to any other kind of misuse or detrimental exposure, or has been involved in an accident.
- E. The preceding paragraphs set forth the exclusive remedies for claims based upon defects in or nonconformity of the Equipment, whether the claim is in contract, warranty, tort (including negligence), strict liability or otherwise, and however instituted. Upon the expiration of the warranty period, all such liability shall terminate. The foregoing warranties are exclusive and in lieu of all other warranties, whether oral, written, expressed, implied or statutory. NO IMPLIED OR STATUTORY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT OR EXEMPLARY DAMAGES.

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